Simultaneous Radioimmunoassay for Triiodothyronine (T3) and Thyroxine (T4) in Unextracted Human Serum

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Rapid radioimmunoassay for the simultaneous measurement of T3 and T4 in 25 ul unextracted serum has been developed.

8-Anilino-1-Naphthalene sulfonic acid has been used to inhibit binding of the two hormones to thyroxine binding protein.

Comparison of T4 with competitive protein binding assay and T3 with those determined by our previously developed radioimmunoassay afford excellent agreement. In 72 normal subjects mean T3 concentration 122.5+3.3ng/dl (Mean+SE) and T4 was 7.0+0.2ug/dl. In 36 patients with hyperthyroidism mean T3 640.3+58.3ng/dl and mean T4 was 17.8+0.7ug/dl. In 20 hypothyroid subjects mean T3 was 37.0+3.3ng/dl and mean T4 was 1.7+0.3ug/dl.

In normal subjects diurnal variation of T3 was observed the highest at 0 o'clock (mean T3 158.7 ng/dl at 0 o'clock, 133.6ng/dl at 6 o'clock, 132.7 ng/dl at 12 o'clock, 125.8ng/dl at 18 o'clock), while did not T4.

22yr. female patient with exophthalmos without any thyrotoxic symptom and sign showed high T3 (400ng/dl) and normal T4 (10.7ug/dl) in her blood. She was diagnosed with T3 toxicosis and treated with antithyroid drug which was so effective that she was relieved from the treatment after 3 month.

Significant increase of T3 and T4 was observed after synthetic TRH administration per os. It's indicated that increment of T3 and T4 in the serum could be one of indicater in TRH test.

Significant correlationship between basal TSH and T3 or T4 ($r=-0.731$, $r=-0.612$) were observed. Significant correlationship between TSH peak level after TRH administration and T3 or T4 ($r=-0.803$, $r=-0.727$) were observed. These results indicated that simultaneous radioimmunoassay for T3 and T4 was very useful for diagnosis of thyroid disease and one of useful tool of study of the hypothalamic pituitary thyroid axis.

Diagnosis of Thyroid Function by in Vitro Test Determinations of Free Thyroxine and of Triiodothyronine Concentrations in Serum

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It has been previously reported that the free thyroxine concentrations in serum were the most useful indicators of thyroid status irrespective of serum binding protein abnormality. However, the procedure, by which the free thyroxine concentrations were determined, was complicated to use